

## REMARKS

By the present amendment: claims 29, 33, 37-39, 42 and 62 are amended to require glyphosate, or a salt or ester thereof and claims 29, 33, 37-39, 42, 46 and 62 are amended to require a pyridine analog or a salt or ester thereof; and the word "about" is deleted from claims 49 and 50. Support for salts and esters of glyphosate is provided by the specification at page 40, line 38, and at page 13, line 8 wherein US Patent No. 4,450,531 that describes salts and esters of glyphosate has been incorporated by reference. Support for salts and esters of the pyridine analog herbicide species is provided by the specification at page 13, lines 18-19 and 30-32, and page 15, line 32.

### A. Non-Statutory Obviousness-Type Double Patenting Rejections

#### 1. U.S. Patent No. 7,008,904

Applicants acknowledge the withdrawal of the rejection of claims 29-53 on the ground of nonstatutory obviousness-type double patenting as not being patentably distinct over claims 1-10, 32, 37-139, 52, 53, 61, 89-92 and 107 of U.S. Patent No. 7,008,904.

#### 2. U.S. Patent Application Numbers 11/368,873, 11/227,577 and 11/438,573

In Applicant's October 23, 2008 response to the Office action dated June 23, 2008, Applicants noted that the obviousness-type double patenting rejections over co-pending applications 11/368,862, 11/227,577 and 11/438,573 were **provisional** and stated that the merits of the rejections would be addressed at such time when the present application is indicated to contain allowable subject matter. In response, the Office at page 5 of the present Office action stated:

"Applicant's request to hold in abeyance the nonstatutory obviousness-type double patenting provisional rejection of claims 29-53 and 59 over copending Application No. 11/368,873...11/227,577...and...11/438,573 is acknowledged. (However, the nonstatutory obviousness-type double patenting rejection should be maintained until claims are in condition for allowance.) what is the meaning of this?"

In response, Applicant's point out that double patenting can only occur between issued patents. As between two copending applications, double patenting cannot exist, hence the "provisional" nature of the rejection. Because pending claims may potentially be amended during prosecution and thereby avoid the subject matter of a copending application (or issued

patent), in many cases applicants request that the provisional rejection be held in abeyance until it is the only remaining issue. At that time, the nonstatutory double patenting rejection can be overcome via a terminal disclaimer. Applicants refer the Office to the provisions of MPEP §804.I.B wherein it is stated that a nonstatutory double patenting rejection should be made provisional where

"two copending applications...would raise an issue of double patenting if one of the applications becomes a patent....The 'provisional' double patenting rejection should continue to be made by the examiner in each application as long as there are conflicting claims in more than one application....If 'provisional' ODP rejections in two applications are the only rejections remaining in those applications, the examiner should withdraw the ODP rejection in the earlier application permitting that application to issue without the need for a terminal disclaimer. A terminal disclaimer must be required in the later-filed application before the ODP rejection can be withdrawn and the application permitted to issue."

Regarding the rejection of the claims over copending US patent application number 11/368,873, Applicants wish to follow up on the Office action response filed on October 23, 2008 and again point out that the rejection should have instead been made over US patent application number 11/368,872. As compared to the present application, the '873 application is directed to different subject matter (clothes hangers) and has different inventive entities and assignees, and therefore cannot serve as the basis for a double patenting rejection.

#### **B. Rejection Under 35 USC §112, Second Paragraph**

Claims 59, 33, 37-39 and 42 stand rejected under USC §112, second paragraph. The Office asserts that the terms "derivatives" and "analogs" are not defined in the specification. Applicants wish to follow up on the Office action response filed on October 23, 2008 and again point out that the rejection of claim 59 appears to be a typographical error. Applicants again presume that the Office intended to instead refer to "claims 29 ~~59~~, 33, 37-39 and 42" because claim 29 is an independent composition claim containing the terms "derivatives" and "analogs," while claim 59 is a method claim that incorporates composition claim features.

It is submitted that the term "pyridine analog" is defined with the requisite degree of clarity as required under USC §112, second paragraph, and as stated at MPEP §2173.01<sup>1</sup>. The

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<sup>1</sup> "A fundamental principle contained in 35 U.S.C. 112, second paragraph is that applicants are their own lexicographers. They can define in the claims what they regard as their invention essentially in whatever terms they choose so long as any special meaning assigned to the term is clearly set forth in the specification."

words of a claim must be given their "plain meaning" unless such meaning is inconsistent with the specification, wherein "plain meaning" refers to the ordinary and customary meaning given to the term by those of ordinary skill in the art.<sup>2</sup> As explained in the Office action response dated, October 23, 2008, the entries from the *Herbicide Handbook* attached thereto show that each of the disclosed pyridine analog species triclopyr, fluroxypyr, clopyralid, dithiopyr, thiazopyr and picloram is based on pyridine and differ by the identity of the substituted functional groups. See also the page 8 of 13 of the herbicide classification taken from the online reference, *Compendium of Pesticide Common Names* that was appended to the October 23, 2008 response wherein the above listed pyridine analog species are among those listed in the pyridine herbicide genus further including the species aminopyralid, clodinate, diflufenican, flufenican, haloxydine, picolinafen, pyriclor and pyroxsulam. Based on the specification and common general knowledge, it is submitted that it would be clear to one skilled in the art that "pyridine analog" herbicides are substituted pyridines, and that term could only have one unambiguous meaning. Therefore, based on common general knowledge known to those skilled in the art and in reference to six representative pyridine analog herbicide species, it is submitted that the term "pyridine analog" satisfies the requirements under USC §112, second paragraph, and the associated rejection should be withdrawn.

Applicants respectfully submit that amended claims 29, 33, 37-39 and 42 meet the requirements under USC §112, second paragraph, because, as explained above in the introductory paragraph to the REMARKS, the term "salts and esters," in reference to glyphosate and the claimed pyridine analog herbicide species, is defined in the specification.

Applicants further submit that amended claims 49 and 50 meet the requirements under USC §112, second paragraph, because the phrase "at least about" has been amended to read "at least."

Withdrawal of the rejection of claims 29, 33, 37-39, 42, 49 and 50 under 35 U.S.C. §112, second paragraph, is therefore requested.

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<sup>2</sup> MPEP §2111.01

**C. Rejection Under 35 USC §103**

Claims 29-53, 59 and 62 are rejected under 35 USC §103(a) as being obvious over **Hacker et al.** (US 6,677,276 B1), **Brigance** (US 2002/0155953 A1) and **Jimoh** (US 2003/0004063 A1).

**1. The present invention**

Glyphosate is very effective in killing or controlling the growth of unwanted plants. However, glyphosate uptake (i.e., absorption) by the plant and translocation through the plant is relatively slow. Thus, visual symptoms that a plant has been treated with glyphosate may not appear until one week or more after application to the plant. See the specification at page 1, lines 14-25.

The problem solution of the present invention is directed to combining a pyridine analog herbicide (or a salt or ester thereof) with glyphosate (or a salt or ester thereof), glyphosate being in excess, in the presence of a surfactant in order to achieve one of the objects of the present invention of obtaining both early symptoms of plant treatment that are associated with the pyridine analog herbicide and prolonged control of the plant associated with glyphosate (see the specification at page 1, lines 6-13, and page 12, lines 2-8). Early symptoms of plant treatment are visible in 4 days or less after treatment (see the specification at page 19, lines 5-9). Problematically, the prior art teaches that pyridine analog herbicides can be antagonistic and can reduce the herbicidal activity of glyphosate or a herbicidal derivative thereof (see the specification at page 19, lines 10-12). In accordance with the present invention, it has been discovered that combining glyphosate in a weight percent acid equivalent ("a.e.") excess over the pyridine analog herbicide overcomes the antagonism problem and provides enhanced early symptoms of herbicidal efficacy for the combination of herbicides as compared to what would be expected from the additive effect of the herbicides individually applied. The present invention therefore allows for early plant kill, increased herbicidal efficacy and lower herbicide application rates for the claimed combination as compared to the herbicides applied individually. Lower herbicide application rates result in cost savings and less unwanted environmental exposure.

As made of record in the Office action response filed October 23, 2008, Applicants have discovered that the claimed co-herbicide combination provides enhanced early symptoms of herbicidal efficacy. See, for instance, Table 4.4.1 at pages 69-70 of the specification, where the

claimed co-herbicide combination was shown to provide enhanced early symptoms of herbicidal efficacy on Fescue/Blue and Golden Rod at 5 DAT as compared to what would be expected from the additive effect of the herbicides individually applied. Under the Colby method for estimating synergy<sup>3</sup>, an expected herbicidal efficacy for the combination of glyphosate (Roundup Brush) and triclopyr (Brush-B-Gone) when applied to Fesc/Blue is 75 and when applied to Golden Rod is 70. For Fesc/Blue, the actual efficacy at 5 DAT for the compositions containing glyphosate and triclopyr in the ratio range of 6:1 (i.e., 18+3 as reported in Table 4.1.1) to 36:1 (i.e., 18+0.5) exceeded the expected value of 75 thereby indicating enhanced efficacy for the claimed compositions. For Golden Rod, the actual efficacy at 5 DAT for the compositions containing glyphosate and triclopyr in the ratio range of 6:1 (i.e., 18+3) to 9:1 (i.e., 18+2) exceeded the expected value of 70 thereby indicating enhanced efficacy at 5 DAT for the claimed compositions.

## 2. The Cited Prior Art

### (a) Jimoh

**Jimoh** is directed to liquid concentrate herbicidal emulsion compositions comprising a coformulation of a water soluble herbicide dissolved in a continuous aqueous phase and an oil soluble herbicide dissolved in a solvent in a discontinuous oil phase. **Jimoh** solves the problem of chemical degradation of oil-soluble herbicides when exposed to water by isolating the oil-soluble herbicide in the discontinuous oil phase (see throughout the specification, for instance, paragraph [0049]). Glyphosate and triclopyr are described among a listing of 52 water-soluble herbicides and dithiopyr and thiazopyr are described among a listing of 192 oil soluble herbicides. **Jimoh** expressly teaches away from combining glyphosate and an oil soluble herbicide such as dithiopyr or thiazopyr in an aqueous herbicidal composition as is encompassed

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<sup>3</sup> See Colby, S.R., "Calculating synergistic and antagonistic response of herbicide combinations," Weeds, 15, 20-22, 1967 (attached). The Colby method is widely accepted by those skilled in the art as a method for determining whether herbicide combinations show antagonism or synergy. Under the Colby method, the expected efficacy for a herbicide combination is calculated from the efficacy of those herbicides applied individually according to the equation:

$$E = X + Y - XY/100$$

where E is the expected herbicidal efficacy, X is the percent inhibition of growth by herbicide A (i.e., glyphosate) and Y is the percent inhibition of growth by herbicide B (i.e., triclopyr). For Fesc/Blue from table 4.4.1 of the instant application, an expected efficacy (E) of 75 is calculated from the individual efficacies as follows:  $(50 + 50) - (50)(50)/100 = 75$ . For Goldenrod from table 4.4.1, (E) of 70 is calculated from the individual efficacies as follows:  $(50 + 40) - (50)(40)/100 = 70$ .

by the present claims because he teaches that the oil soluble herbicide degrades in the presence of water.<sup>4</sup> **Jimoh** does not teach or suggest that glyphosate-pyridine analog herbicide antagonism can be overcome by formulating glyphosate in excess, or that herbicidal efficacy for some of the claimed combinations is greater than what would be expected based on the herbicidal efficacy of the herbicides applied individually.

Glyphosate and triclopyr are among the 52 water-soluble herbicides that are described and claimed by **Jimoh** (see claims 6, 33, 59, 89 and 116 and paragraph [0027]). From among the 52 disclosed water soluble herbicides, the combination of glyphosate and triclopyr is but one out of a possible 1326 two water soluble herbicide combinations.<sup>5</sup> Further, triclopyr is not among the water soluble herbicides described in the last two sentences of paragraph [0028] as being particularly preferred (i.e., bialaphos, glufosinate, glyphosate and the imidazolinones imazameth, imazamethabenz, imazamox, imazapic, imazapyr, imazaquin and imazethapyr). Thus, **Jimoh** does not suggest a preference for the instantly claimed combination from among the 1326 possible combinations encompassed by the broad disclosure. **Jimoh** therefore provides no teaching, suggestion or motivation to one skilled in the art to select the specific combination of glyphosate and triclopyr from among the innumerable possible combinations of water soluble herbicides, and to further formulate selected combination in the absence of an oil soluble herbicide and an organic solvent.

Regarding combinations of a water soluble herbicide and an oil soluble herbicide, dithiopyr and thiazopyr are among the 192 listed oil soluble herbicides that are described and claimed by **Jimoh** (see claims 1, 28, 55, 85 and 112 and paragraph [0031]). Among the oil soluble herbicides, a total of 191 are described as preferred (see paragraph [0032]). From the list of 9 most preferred water soluble herbicides and 191 preferred water insoluble herbicides, 1719 possible herbicide combinations are calculated.<sup>6</sup> **Jimoh** provides no teaching, suggestion or motivation to one skilled in the art to select the specific combination of glyphosate and dithiopyr or glyphosate and thiazopyr from among the 1719 possible co-herbicide combinations, while

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<sup>4</sup> See Jimoh paragraphs [0006], [0008], [0009], [0011], [0012], [0016], [0049], [0050], [0052] and Example 11.

<sup>5</sup> Calculated as number of combinations = total number of permutations/number of permutations of each set. Mathematically:  ${}^nC_r = n!/r!(n-r)! = 52*51/2!*1! = 272/2 = 1326$  possible combinations of two herbicide compositions from a set of 52 herbicides.

<sup>6</sup> Calculated as number of combinations  $9*191 = 1719$  possible combinations of preferred water soluble herbicides and water-insoluble herbicides.

rejecting the remaining combinations, much less to formulate that selected combination in the absence of an organic solvent.

Although the "comprising" language present claims does not exclude the possibility of including an organic solvent, the objects of the invention are surprisingly achieved in the absence of a solvent. Even though organic solvents are not excluded from the scope of the claims, **Jimoh** is distinguished by the defined combination of glyphosate and a pyridine analog herbicide in an aqueous composition. In view of **Jimoh**, it is unexpected and surprising that the instantly claimed combination can achieve both early symptoms of plant treatment that are associated with the pyridine analog herbicide and prolonged control of the plant associated with glyphosate.

Therefore, as compared to the present invention:

- (i) **Jimoh** provides no teaching, suggestion or motivation to one skilled in the art to select the specific combination of glyphosate and triclopyr from among the 1326 possible combinations of two water soluble herbicides;
- (ii) **Jimoh** provides no teaching, suggestion or motivation to one skilled in the art to select glyphosate from among the 9 preferred water soluble herbicides and select dithiopyr or thiazopyr from among the 191 preferred oil soluble herbicides to arrive at the combination of glyphosate and dithiopyr or glyphosate and thiazopyr from among the 1719 possible water soluble and oil soluble co-herbicide combinations;
- (iii) **Jimoh** discloses that dithiopyr or thiazopyr must be dissolved in an organic solvent to minimize chemical degradation, and therefore teaches away from the present claims that encompass the combination of dithiopyr or thiazopyr with glyphosate in an aqueous phase, and in the absence of an organic solvent;
- (iv) **Jimoh** addresses a different problem (degradation of oil-soluble herbicides upon exposure to aqueous medium) than do the present claims (overcoming glyphosate-pyridine analog antagonism to achieve both early plant control symptomology and long term plant control);
- (v) **Jimoh** does not recognize the ratio of glyphosate to coherbicide as a result effective variable and does not teach or suggest that glyphosate-pyridine analog herbicide antagonism can be overcome by formulating glyphosate in a weight percent excess; and

- (vi) **Jimoh** does not suggest that herbicidal efficacy for some of the claimed combinations can be greater than what would be expected based on the herbicidal efficacy of the herbicides applied individually.

**(b) Hacker**

**Hacker** describes a large number of herbicide combinations for control of harmful plants in herbicide-tolerant oil-seed rape crops. **Hacker** describes combinations of "Group A" herbicides and "Group B" herbicides wherein columns 5-8 lists 15 Group A herbicides (including glyphosate) and 20 Group B herbicides (including clopyralid). From that listing, a total of 150 two component herbicide combinations are possible.<sup>7</sup> Column 9, line 46 to column 10, line 3 lists 57 preferred herbicide combinations, while column 10:46-64 list another preferred 40 preferred herbicide combinations. The combination of glyphosate and clopyralid are among the disclosed combinations. **Hacker** provides no glyphosate working examples. Thus, **Hacker** does not suggest a preference for the instantly claimed combination from among the 40 preferred possible combinations encompassed by the broad disclosure.

In the case of the combination of glyphosate (i.e., "A2") and the broadly described genus of dicotyledonous plant foliar-acting herbicides (i.e., "B2") that includes clopyralid, a weight ratio of A2 to B2 of 2000:1 to 1:250 is disclosed. In particular, of the range taught by **Hacker**, a weight ratio of pyridine analog to glyphosate of from 250:1 to 1:1 (i.e., a pyridine analog excess) is described as suitable for the practice of his invention. To the contrary, ratios wherein the pyridine analog herbicide is in excess are excluded from the scope of the pending claims.

The very broad **Hacker** disclosure fails to recognize that the instantly claimed pyridine analog herbicides can be antagonistic to the herbicidal activity of glyphosate. **Hacker** broadly discloses synergy for the combination of 4 different classes of Group A herbicides and 6 different classes of Group B herbicides<sup>8</sup> encompassing over 40 herbicide species, but does not

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<sup>7</sup> Calculated as number of combinations = total number of permutations/number of permutations of each set. Mathematically:  ${}^nC_r = n!/r!(n-r)! = 20*15/2!*1! = 300/2 = 150$  possible combinations of two herbicide compositions.

<sup>8</sup> Group A herbicides include glufosinate (a glutamine synthetase inhibitor); glyphosate (an enolpyruvyl shikimate-3-phosphate (EPSP) synthase inhibitor); imidazolinones (acetolactate synthase (ALS) or acetoxyhydroxy acid synthase (AHAS) inhibitors); and pyraflufen, carfentrazone, oxadiargyl and sulfentrazone (protoporphyrinogen (PPO) inhibitors). Group B herbicides include metazachlor, trifluralin, naproamide and carbetamide (mitosis inhibitors); clomazone, (carotenoid biosynthesis inhibitors); dimetufuron and pyridate (photosystem II inhibitors); clopyralid (synthetic auxins); ethametsulfuron-methyl (acetolactate synthase (ALS) or acetoxyhydroxy acid synthase (AHAS)



present any Experimental evidence to support synergy for glyphosate compositions, much less glyphosate in combination with a pyridine analog herbicide as is instantly claimed. **Hacker** acknowledges at column 1:45-49 that biological incompatibility and lack of stability of a coformulation occurs "not infrequently." In view of **Hacker's** very broad disclosure, suggestion that biological incompatibility can occur, and lack of evidence regarding specific combinations of glyphosate and pyridine analog herbicides, one skilled in the art would have looked to **Jimoh** for guidance regarding the properties of such combinations. As explained above, **Jimoh** teaches away by expressly disclosing that combinations of glyphosate and a pyridine analog herbicide can be unstable (i.e., antagonistic) in aqueous formulations. **Hacker** fails to suggest that the antagonism can be overcome by formulating glyphosate in a weight percent excess on an acid equivalent basis over the pyridine analog herbicide.

Therefore, as compared to the present invention:

- (i) **Hacker** also fails to teach or suggest that glyphosate-pyridine analog herbicide antagonism can be overcome by formulating glyphosate in a weight percent excess. **Hacker** does not recognize the ratio of glyphosate to coherbicide as a result effective variable for overcoming antagonism and variation and/or optimization thereof would therefore not be obvious.<sup>9</sup> In particular, **Hacker** does not recognize co-herbicide ratio as a variable that affects antagonism and does not attach any importance to the instantly claimed weight ratio range of glyphosate to coherbicide in the broadly disclosed range of from 2000:1 to 1:250. **Hacker** therefore teaches that an excess of pyridine analog herbicide to glyphosate from 1:1 to as much as 250:1 (a range that is excluded from the scope of the pending claims) is suitable for the practice of the invention and teaches away from the present invention in that regard. Thus, **Hacker** does not teach, suggest or attach any importance to the selection of glyphosate and pyridine analog herbicide wherein glyphosate is in excess on a weight percent a.e. basis, as is instantly claimed.

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inhibitors); quizalofop, fenoxaprop, fluazifop, haloxyfop, propaquizafop, sethoxydim, cycloxydim and clethodim (acetyl CoA carboxylase (ACCase) inhibitors).

<sup>9</sup> Per MPEP §2144.05, to support a prima facie case of obviousness, "[a] particular parameter must first be recognized as a result effective variable, i.e., a variable which achieves a recognized result, before the determination of the optimum or workable ranges of said variable might be characterized as routine experimentation." citing *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPOA 1977).

- (ii) **Hacker** does not teach or suggest that both short- and long-term plant control can be achieved with the instantly claimed herbicide combinations;
- (iii) **Hacker** provides no glyphosate working examples and therefore does not attach any importance to glyphosate compositions that would have motivated one skilled in the art to select the claimed composition from among the over 40 combinations while rejecting the remaining combinations disclosed therein;
- (iv) **Hacker** addresses a different problem (control of harmful plants in crops of herbicide tolerant oil-seed rape) than do the present claims (overcoming glyphosate-pyridine analog herbicide antagonism in order to achieve both early plant control symptomology and long term plant control); and
- (v) **Hacker** does not suggest that herbicidal efficacy for some of the claimed combinations can be greater than what would be expected based on the herbicidal efficacy of the herbicides applied individually.

**(c) Brigance**

**Brigance** is directed to eye irritancy-reducing adjuvant compositions for use in pesticide formulations comprising a mixture of a polyoxyalkylene aliphatic amine, a mixture of polyhydric alcohols and a metal-complexing carboxylic acid. Disclosed at paragraph [0018] are 17 exemplary herbicides including glyphosate and picloram. From the list of 17 herbicides, 136 two herbicide compositions are possible.<sup>10</sup> Of those herbicides, only glyphosate is described as preferred; no preference for picloram or a mixture of picloram and glyphosate is described or suggested. **Brigance** does not disclose weight ratios between co-herbicides. Each example is directed to glyphosate; no mixed herbicide examples are presented, much less a combination of glyphosate and a pyridine analog herbicide.

Therefore, as compared to the present invention:

- (i) **Brigance** provides no teaching, suggestion or motivation to one skilled in the art to select the specific combination of glyphosate and picloram from the 136 possible co-herbicide combinations;

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<sup>10</sup> Calculated as number of combinations = total number of permutations/number of permutations of each set. Mathematically:  ${}^nC_r = n!/r!(n-r)! = 17*16/2!*1! = 272/2 = 136$  possible combinations of two herbicide compositions from a set of 17 herbicides.

- (ii) The instantly claimed combinations are not among **Brigance's** preferred embodiments;
- (iii) The claim element directed to the weight ratio of glyphosate to pyridine analog is missing from **Brigance**. **Brigance** therefore does not teach, suggest or attach any importance to weight ratios between co-herbicides, much less the selection of glyphosate and picloram wherein glyphosate is in excess on a weight percent a.e. basis;
- (iv) **Brigance** addresses a different problem (eye irritancy) than do the present claims (overcoming glyphosate-pyridine analog antagonism to achieve both early plant control symptomology and long term plant control);
- (v) **Brigance** does not teach or suggest that glyphosate-pyridine analog herbicide antagonism can be overcome by formulating glyphosate in a weight percent excess; and
- (vi) **Brigance** does not suggest that herbicidal efficacy for some of the claimed combinations can be greater than what would be expected based on the herbicidal efficacy of the herbicides applied individually.

### 3. The legal standard for establishing a *prima facie* case of obviousness

Initially, the determination of whether a claim is obvious within § 103(a), depends on at least four underlying factual issues set forth in *Graham v. John Deere Co. of Kansas City*<sup>11</sup>: (1) the scope and content of the prior art; (2) differences between the prior art and the claims at issue; (3) the level of ordinary skill in the pertinent art; and (4) evaluation of any relevant secondary considerations. In April 2007, the Supreme Court in *KSR International Co. v. Teleflex Inc* affirmed the *Graham* analysis as the framework for determining obviousness.<sup>12</sup>

*KSR* clarified the guidelines for making a proper determination of obviousness under 35 U.S.C. §103. The *KSR* Court rejected a rigid application of the teaching, suggestion or motivation test in an obviousness inquiry and held that there must be a reason for one skilled in

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<sup>11</sup> 383 U.S. 1, 17, 86 S.Ct. 684, 15 L.Ed.2d 545 (1966).

<sup>12</sup> *KSR Int'l Co. v. Teleflex Inc.*, 127 S.Ct. 1727, 1739 (2007), 82 USPQ2d 1385 (2007).

the art to modify and/or combine the elements of the prior art in a particular manner that would yield the claimed invention.<sup>13</sup>

In response to *KSR*, the USPTO issued new guidelines for examiners regarding the obviousness standard (72 Fed. Reg. 57526-35, 10/10/07) and revised MPEP §2141.III to articulate rationales to support rejections under 35 USC §103 as follows: (A) Combining prior art elements according to known methods to yield **predictable results**; (B) Simple substitution of one known element for another to obtain **predictable results**; (C) Use of known technique to improve similar devices (methods or products) in the same way; (D) Applying a known technique to a known device (method or product) ready for improvement to yield **predictable results**; (E) "**Obvious to try**" - choosing from a finite number of identified, **predictable solutions, with a reasonable expectation of success**; (F) Known work in one field of endeavor may prompt variations of it for use in either the same field or a different one based on design incentives or other market forces if the variations are **predictable** to one of ordinary skill in the art; and (G) Some **teaching, suggestion or motivation** in the prior art that would have led one of ordinary skill to modify the prior art reference teachings to arrive at the claimed invention (emphasis added). In view of the above, the guidelines supporting an obviousness rejection under 35 USC §103 may be summarized into three basic concepts (1) predictable results; (2) obvious to try; and (3) teaching, suggestion, or motivation to combine references.

In view of the MPEP and *KSR*, it is clear that, to establish a *prima facie* case of obviousness, the Office must (1) show that each claimed element is described in the prior art; (2) show a reason to combine the prior art elements to produce the claimed invention; and (3) show a reasonable expectation of success and at least some degree of predictability.

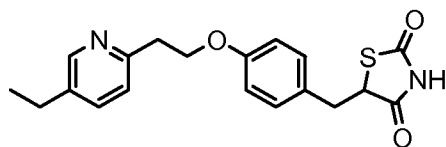
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<sup>13</sup> ...a patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, *it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does*. This is because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. (Emphasis added.) *KSR*, 82 USPQ2d at 1396.

Often, it will be necessary ... to look to interrelated teachings of multiple patents; the effects of demands known to the design community or present in the marketplace; and the background knowledge possessed by a person having ordinary skill, all in order to determine whether there was an apparent reason to combine the known elements in the fashion claimed by the patent at issue. To facilitate this review, this analysis should be made explicit. *KSR*, 82 USPQ2d at 1396.

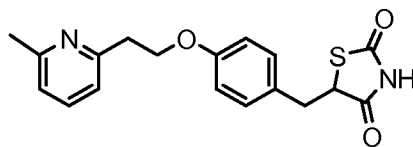
In analogous case law where the claims at issue claims are directed to a chemical compound, the analysis of the second *Graham* factor, i.e., the differences between the claimed invention and the prior art, often turns on the structural similarities and differences between the claimed compound and the prior art compounds.<sup>14</sup> Obviousness based on structural similarity thus can be proved by identification of some motivation that would have led one of ordinary skill in the art to select and then modify a known compound (i.e. a lead compound) in a particular way to achieve the claimed compound.<sup>15</sup> It is submitted that the *Eli Lilly* and *Takeda* analyses are applicable to the present claims.

In *Takeda*, the Federal Circuit addressed the obviousness issue for structurally similar chemical compounds. In *Takeda*, the claim at issue recited pioglitazone (5-{4-[2-(5-ethyl-2-pyridyl)ethoxy] benzyl}-2,4-thiazolidinedione.”) having the following structure:



The ethyl substituent is attached to the 5-position on the pyridyl ring.

Alphapharm filed an ANDA to manufacture and sell a generic version of pioglitazone. According to Alphapharm, Takeda’s claimed compound would have been obvious over the prior art compound TZD (“compound b”: a pyridyl ring with a methyl (CH<sub>3</sub>) group attached to the 6-position of the ring)<sup>16</sup>, having the following structure:



Alphapharm argued that one of ordinary skill in the art would select compound b for antidiabetic research and then make “two obvious chemical changes: first, homologation, i.e., replacing the methyl group with an ethyl group, which would have resulted in a 6-ethyl compound; and second, ‘ring-walking,’ or moving the ethyl substituent to another position on the ring, the 5-position, thereby leading to the discovery of pioglitazone.”<sup>17</sup>

<sup>14</sup> See *Eli Lilly & Co. v. Zenith Goldline Pharms., Inc.*, 471 F.3d 1369, 1377; 81 USPQ2d 1324 (Fed. Cir. 2006).

<sup>15</sup> See *Takeda Chem. Indus. v. Alphapharm Pty., Ltd.*, 492 F.3d 1350, 1356; 83 USPQ2d 1169 (Fed. Cir. 2007).

<sup>16</sup> *Id.* at 1354.

<sup>17</sup> *Id.* at 1357.

The district court found, however, that one of ordinary skill in the art would not have selected compound b from the “hundreds of millions” of possible compounds. “[T]he prior art did not suggest to one of ordinary skill in the art that compound b would be the best candidate as the lead compound for antidiabetic research.”<sup>18</sup> The Federal Circuit affirmed and held that there was no motivation to select a particular prior art compound (e.g., compound b) from the universe of prior art compounds and even if there was such a motivation, nothing in the prior art would have led a skilled person to modify compound b to arrive at the claimed compound. As *KSR v. Teleflex* and *Takeda v. Alphapharm* emphasize, it is important to “identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does.”<sup>19</sup>

#### **4. Claims 29-53, 59 and 62 meet the requirements under 35 U.S.C. §103(a)**

Applicants respectfully submit that the Office has failed to establish a *prima facie* case of obviousness and the pending claims are non-obvious over **Hacker**, **Brigance** and **Jimoh** under an analysis of the *Graham* factors in view of the guidance provided by the MPEP, *KSR*, *Takeda* and *Eli Lilly*.

##### **(a) The references and the instant claims are directed to different problems**

As a threshold issue, the purpose of the references should be considered.<sup>20</sup> When a reference has the same purpose, it relates to the same problem, and that fact supports use of that reference in an obviousness rejection, but when a reference has a different purpose, the inventor would have less motivation to consider it.<sup>21</sup> The purpose of **Hacker** is the control of harmful plants in crops of herbicide tolerant oil-seed rape, the purpose of **Brigance** is to reduce eye irritancy of herbicidal compositions and the purpose of **Jimoh** is to prevent degradation of oil-soluble herbicides upon exposure to aqueous medium. Those purposes are very different from Applicants' purpose of overcoming glyphosate-pyridine analog antagonism in order to achieve both early plant control symptomology and long term plant control. Thus **Hacker**, **Brigance** and **Jimoh** are not reasonably pertinent to Applicants' particular problem and would not have been

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<sup>18</sup> *Id.* at 1358.

<sup>19</sup> *KSR v. Teleflex, Inc.*, 82 U.S.P.Q.2d 1385, 1396.

<sup>20</sup> See *In re Clay*, 23 U.S.P.Q.2d 1058, 1060 (Fed. Cir. 1992) at 1061.

<sup>21</sup> *Id.*

considered by one of ordinary skill in the art in determining the obviousness of the subject matter of the pending claims.

**(b) The cited prior art references, individually or in combination, do not suggest the claimed combination**

**(i) The second step of the Graham analysis requires consideration of the differences between the prior art and the claims at issue.**

**Jimoh** is directed to a large number of possible liquid concentrate herbicidal emulsion compositions comprising a coformulation of a water soluble herbicide dissolved in a continuous aqueous phase and an oil soluble herbicide dissolved in a solvent in a discontinuous oil phase. **Jimoh** does not describe or suggest the claimed combination of co-herbicides in an aqueous phase and expressly teaches away from the present claims by disclosing that glyphosate and the pyridine analog herbicide thiazopyr will degrade if combined in such a manner.

**Hacker** is directed to a large number of herbicidal possible formulations used for the control of harmful plants in crops of herbicide tolerant oil-seed rape. Selection of the instantly claimed combinations and formulating glyphosate in excess to overcome glyphosate-pyridine analog herbicide antagonism is not described or suggested.

**Brigrance** is directed to a large number of possible eye irritancy-reducing adjuvant compositions for use in pesticide formulations. Selection of the instantly claimed combinations and formulating glyphosate in excess to overcome glyphosate-pyridine analog herbicide antagonism is not described or suggested.

None of the cited references recognize the ratio of glyphosate to co-herbicide as being a result effective variable for the purpose of the pending claims.

Thus the differences between the claims and the prior art are the selection of the combination of glyphosate and a pyridine analog herbicide in an aqueous medium wherein glyphosate is in weight percent excess for the purpose of overcoming antagonism between glyphosate and pyridine analog herbicides in order to achieve both short- and long-term plant control.

**(ii) The Office has failed to show that there is a reason to combine the prior art elements to arrive at the claimed combination of glyphosate and a pyridine analog herbicide**

There is nothing in **Hacker**, **Brigance** and/or **Jimoh** that would have motivated or led one skilled in the art to select the instantly claimed combination from among the innumerable possible herbicide combinations disclosed therein, much less to formulate glyphosate in a weight percent a.e. excess for the claimed purpose with any expectation of success or predictability of result.

**Brigance** and **Hacker** fail to recognize the problem of overcoming antagonism between glyphosate and pyridine analog herbicides for the purpose of obtaining both early symptoms of plant treatment that are associated with the pyridine analog herbicide and prolonged control of the plant associated with glyphosate, and **Jimoh** expressly teaches that water-insoluble pyridine analog herbicides degrade upon exposure to water. Because the instant problem is not acknowledged in the art, one skilled in the art would not have been motivated to select the specific combination of glyphosate and clethodim from among the over 40 co-herbicide combinations disclosed in **Hacker**, or glyphosate and picloram from the possible 136 co-herbicide combinations disclosed by **Brigance**.

Nor would **Jimoh** have motivated one skilled in the art to (i) select the specific combination of glyphosate and triclopyr from the possible 1326 water soluble co-herbicide combinations or (ii) select the specific combination of glyphosate and dithiopyr or glyphosate and thiazopyr from among the 1719 possible combinations of water soluble and oil soluble herbicides and combine both herbicides in an aqueous medium instead of dissolving the oil soluble herbicides dithiopyr and thiazopyr in an organic solvent.

As previously explained, **Hacker** broadly discloses synergy for the combination of 4 different classes of Group A herbicides and 6 different classes of Group B herbicides encompassing over 40 herbicide species, but does not present any experimental evidence to support synergy for glyphosate compositions, much less glyphosate in combination with a pyridine analog herbicide as is instantly claimed. **Hacker** acknowledges at column 1:45-49 that biological incompatibility and lack of stability of a coformulation occurs "not infrequently." One skilled in the art reading **Hacker's** generic disclosure would have looked to **Jimoh** for guidance



regarding the properties of such combinations. **Jimoh** teaches that such compositions can be unstable (i.e., antagonistic) in aqueous formulations.

Viewing the references as a whole, **Hacker**, **Jimoh** and **Brigance** in combination fail teach or suggest that objects of the present invention including (i) overcoming glyphosate-pyridine analog herbicide antagonism by formulating glyphosate in excess or (ii) achieving an herbicidal efficacy for the claimed combination that is greater than what would be expected based on the herbicidal efficacy of the herbicides applied individually. One skilled in the art upon reading the cited references in combination would have predicted that the presently claimed combination would not be compatible, and would thus not be a likely candidate to solve the instant problem and achieve the objects of the present invention.

Under the reasoning of *Takeda*, one of ordinary skill in the art would not have selected the claimed combination from the large number of possible combinations because **Hacker** and **Brigance** provide no reason to consider that such combinations would be promising candidates for both short- and long-term plant control in the absence of antagonism, while **Jimoh** teaches away from that result. Nor do any of those references teach or suggest that the weight ratio of glyphosate to pyridine analog herbicide is a result effective variable and variation thereof would not be an obvious optimization. Thus there is nothing in the prior art that would have led a skilled person to make the claimed combination, nor has the Office clearly articulated a reason that would have prompted a person skilled in the art to combine the elements in the way the claimed new invention does.

(iii) **The Office has failed to show that it would be obvious to optimize the ratio of glyphosate to pyridine analog herbicide to arrive the claimed ratio with any predictability of result or reasonable expectation of success.**

**Brigance**, **Hacker** and **Jimoh** fail to recognize that the ratio of glyphosate to pyridine analog herbicide is a result effective variable and variation thereof would not be an obvious optimization. In particular, **Brigance** does not disclose weight ratios between co-herbicides; **Hacker** discloses a glyphosate to co-herbicide weight ratio of 2000:1 to 1:250; and **Jimoh** does not disclose a weight ratio of glyphosate to co-herbicide that otherwise meets the limitations of the claims.

In view of the **Jimoh's** express teaching away from the present invention, **Hacker** would not have motivated one skilled in the art to, first, select the combination of glyphosate and the pyridine analog herbicide clopyralid from among the over 40 possible combinations and, second, further optimize the ratio from the range of from 2000:1 to 1:250 as described therein to arrive at the claimed weight ratio excess of glyphosate for the purpose of overcoming glyphosate-pyridine analog antagonism in order to achieve both short- and long-term plant control. Only the Applicants have made the discovery that the ratio is a result effective variable that achieves the recognized result of overcoming antagonism. Optimization of the ratio would not have been a matter of routine experimentation and is therefore non-obvious. The claims are therefore patentable over the combination of **Jimoh** and **Hacker**.

**Brigance** fails to overcome the deficiencies in the combination of **Jimoh** and **Hacker**. **Brigance's** teaching is similar to **Hacker** except no ratio of glyphosate to co-herbicide is described and an even greater number of possible co-herbicide combinations are disclosed. In view of **Jimoh** and **Hacker**, **Brigance** would not have motivated one skilled in the art to select the combination of glyphosate and the pyridine analog picloram from the 136 possible co-herbicide combinations. Because **Brigance** fails to describe a glyphosate to co-herbicide weight ratio or attach any purpose to that ratio for any reason, one skilled and would not have been motivated to select that claimed ratio with any expectation of success. The claims are therefore patentable over the combination of **Jimoh** and **Brigance** or **Jimoh**, **Hacker** and **Brigance**.

#### (iv) Hindsight Reconstruction

In view of the above explanation, Applicants respectively submit that a conclusion of obviousness could therefore only be reached by impermissible hindsight reconstruction through importation of the teaching of the present invention. In particular, it is submitted that the Office's rejection relies on the application of a per se obviousness test (hindsight) instead of an analysis of the preponderance of the factual evidence. The fact that a claimed composition is disclosed among a large number of prior art compositions does not by itself render that composition obvious<sup>22</sup>. Because **Hacker**, **Jimoh** and **Brigance** address different problems than does the present invention, because **Jimoh** teaches away from some of the claimed combinations, because none of the references recognize that the ratio of glyphosate to pyridine

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<sup>22</sup> *In re Baird*, 16 F.3d 380, 29 USPQ2d 1550 (Fed. Cir. 1994).

analog herbicide is a result effective variable, and because there is nothing in **Hacker, Jimoh** and **Brigance** that would have suggested a preference for selecting the instantly claimed combination from the innumerable possible combinations, one skilled in the art could have only arrived at the present claims by hindsight reconstruction using Applicants disclosure as a blueprint (which the Office had the benefit of using).<sup>23</sup>

**(v) Evidence of Enhanced Early Symptomology**

The Office asserts that Applicants disclosure of enhanced early symptomology for the claimed combinations must be comparative to the closest prior art to be probative.<sup>24</sup> Applicants did not present the evidence as comparative tests versus the prior art in the Office action response dated October 23, 2008; Applicants submitted that evidence to show that the claimed result is surprising in view of what the prior art teaches. Applicants respectfully maintain that such a direct comparison is unnecessary in view of what **Jimoh** actually teaches. As explained above, one skilled in the art reading **Jimoh** would clearly understand that incompatibility can occur for at least some of the claimed combinations. **Jimoh**, Example 11, demonstrates that the oil-soluble herbicide carfentrazone-ethyl exhibits significant decomposition (i.e., antagonism) when combined with glyphosate, water and less than about 6.6% solvent. Decomposition is reduced only when the solvent concentration is about 8.3% or more. In contrast with the antagonism reported by **Jimoh**, the working examples of the instant application demonstrate that antagonism is avoided using the selected co-herbicides and ratios, in the absence of an organic solvent. Applicants therefore respectfully suggest that a probative comparison of the instantly claimed compositions with **Jimoh** is already of record.

**(vi) Evidence of Unexpected Results**

Applicants submit that the Office has failed to establish a *prima facie* case of obviousness thereby rendering moot the requirement for a showing of unexpected results.

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<sup>23</sup> M.P.E.P. §2142 further provides that in order to reach a proper determination under 35 U.S.C. §103(a), the Examiner must step backward in time and into the shoes worn by the hypothetical "person of ordinary skill in the art" when the invention was unknown and just before it was made. Knowledge of Applicants' disclosure must be put aside in reaching this determination, yet kept in mind in order to determine the "differences." The tendency to resort to "hindsight" based upon Applicants' disclosure is often difficult to avoid due to the very nature of the examination process. However, as stated by the Federal Circuit, impermissible hindsight must be avoided and the legal conclusion must be reached on the basis of the facts gleaned from the prior art. *Grain Processing Corp. v. American-Maize-Products, Co.*, 840 F.2d 902, 904 (Fed. Cir. 1988).

<sup>24</sup> See pages 14-15 of the instant Office action.

**D. Conclusion**

Applicants respectfully submit that claims 29, 33, 37-39 and 42 meet the requirements under USC §112, second paragraph and claims 29-53, 59 and 62 are nonobvious under 35 USC §103(a) over **Hacker, Jimoh** and **Brigance**. Withdrawal of the rejection and allowance of the claims is respectfully requested.

The Commissioner is hereby authorized to charge any underpayment and credit any overpayment of government fees in connection with this response to Deposit Account No. 19-1345.

Respectfully submitted,

/James D. Harper/

James D. Harper, Reg. No. 51,781  
SENNIGER POWERS LLP  
100 North Broadway, 17th Floor  
St. Louis, Missouri 63102  
(314) 231-5400

JDH/mrt